

Claims

1. A process for the production of olefins from a hydrocarbon said process comprising the steps of:
 - a) passing a first feed stream comprising gaseous reactants to a first reaction zone wherein said gaseous reactants react exothermically to provide a product stream
 - 5 b) producing a mixed feed stream comprising oxygen by passing the product stream produced in step (a) and a second feed stream comprising a hydrocarbon feedstock to a mixing zone and wherein oxygen is passed to the mixing zone via one or more of (i) the product stream produced in step (a), (ii) the second feed stream comprising a hydrocarbon feedstock and (iii) a third stream comprising an oxygen-containing gas
 - 10 c) passing the mixed feed stream directly to an essentially adiabatic second reaction zone wherein in the absence of a supported platinum group metal catalyst at least a part of the oxygen is consumed and a stream comprising olefins is produced
 - d) cooling the stream comprising olefins exiting the second reaction zone to less than 650°C within less than 150 milliseconds of formation
 - 15 and wherein the temperature of the mixed stream is at least 500°C, the mixing zone and the second reaction zone are maintained at a pressure of between 1.5-50bar and the residence time within the mixing zone is less than the autoignition delay for the mixed stream.
2. A process as claimed in claim 1 in which an additional feed stream comprising
20 hydrogen is passed to the mixing zone.
3. A process as claimed in claim 1 or claim 2 in which the residence time within the mixing zone is less than 100 milliseconds.

4 A process as claimed in claim 3 in which the residence time within the mixing zone is less than 5 milliseconds

5. A process as claimed in any one of claims 1 to 4 in which the reaction is carried out in the second reaction zone at a pressure of between 5 to 30 bara

5 6. A process as claimed in any one of claims 1 to 5 in which the second reaction zone contains a stabiliser and/or packing material selected from the group comprising porcelain, ceramics, alumina and silica that do not exhibit any substantial catalytic activity

10 7. A process as claimed in any one of claims 1 to 6 in which the second reactor contains an ignition source.

8. A process as claimed in any one of claims 1 to 7 in which the pressure of the second reaction zone is maintained at a pressure of between 5.0-10.0bara and the products are quenched by reducing the temperature to less than 650°C within less than 50milliseconds of formation.

15 9. A process as claimed in any one of claims 1 to 7 in which the pressure of the second reaction zone is maintained at a pressure of between 10.0-20.0bara and the products are quenched by reducing the temperature to less than 650°C within 20milliseconds of formation.

20

25

30